

**RESEARCH STATEMENT**  
**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

***Submitted by:***

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**Title: Developing Economic Tools of Valuing Benefits of Stormwater Treatment**

**Problem / Description:**

Federal and state law requires stormwater discharges to meet water quality standards. This requires treatment of runoff by water quality BMPs before discharging to a surface water body. Therefore, stormwater treatment becomes a common practice for transportation construction projects. While the costs of treating stormwater are substantial, the valuations of benefits are virtually unknown. Information about the valuation of the benefits of stormwater treatment is required by planning (project definition), programming (B/C evaluation), design and project development (selection of cost efficient BMPs), and determination of regulatory practicability (treating stormwater now or later). This study will develop economic tools that estimate the values of stormwater treatment and provide necessary data to transportation decision processes mentioned above. The application of the results of this study will improve the efficiency of transportation decision-making and generate millions of dollars in net benefits of transportation projects.

**Proposed Research Approach:**

Potential Partners: University of Washington, University of California

This study is to utilize conjoint analysis and experimental design to build the valuation models and derive values of stormwater treatments. Conjoint analysis has been used extensively in marketing, transportation and environmental studies to examine individual preferences for private and public goods that have multiple attributes. This method is particularly appropriate for valuing watersheds that are complex ecosystems with many attributes. This study will consider multiple factors that contribute to benefits of treating stormwater: watershed condition index (water quality, Endangered Species Act, etc.), beneficial uses (location, population, etc.), highway impacts (impervious area, average daily traffic, etc.), and stormwater treatment BMPs (detention pond, swale, etc.). A fractional factorial experimental design will be used to create alternative treatments that include different combinations of above factors. The values obtained from this methodology represent the benefits of stormwater treatment given watershed conditions, demographics and highway impacts.

**Potential Benefits:**

This study will provide necessary data of stormwater treatment benefit required by several transportation planning and decision processes:

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1. Planning (Project Definition): The models will be used to estimate the value of stormwater treatment.
2. Project Management: The models will be used to estimate benefits, derive overall project B/C ratio and rank projects (I1, I2 and I4). The models provide critical data for prioritization of I4 projects.
3. Design and Project Development: The models will help the selection of most cost efficient stormwater treatment BMPs. This increases net benefits by saving costs or achieving greater benefits.
4. Determination of Regulatory Practicability: The models will provide data to determine treating stormwater now or treating it later based on the comparison of costs and benefits.
5. Budget, policy and Regulation Development: The data will also support budgeting, policy development and regulation development.
6. The data can also be used by other state DOTs to improve decision efficiency and increase net benefits of transportation projects.